

15° C., 20° C., and 25° C., or lines of the isotherms of these degrees of temperature for the month of August. The broken lines running in towards the shore are the isocrymes of 5° C., 10° C., 15° C., and 20° C., or lines of the isotherms for the month of February. These two sets of isotherms show well the relation of Cape Cod to the average seasonal maxima and minima of the surface temperature of the waters of the coasts above and below it. I have prolonged the isotherm of 20° C. inward to the very coast itself and have attempted to sketch its deflection inward and northward as indicated by such data as to the temperature of the surface waters just offshore as are available. The deflection toward Long Island Sound and along the coast eastward to the shoals about Nantucket Island, thence northward to about Nauset on the eastern coast of the Cape Cod Peninsula, indicate the transition area lying between the North Temperate Zone above and the North Subtropical Zone below. In this transitional area, the outer coasts are of the North Temperate Zone while the inner are of the North Subtropical Zone. The dotted lines in Cape Cod Bay, in Vineyard Sound, and in Long Island Sound indicate that the isotherm of 20° C. passes below the surface at these places. The deflection of the 20° C. isotherm as sketched must be considered as only an approximate to accuracy in details. I have to thank my nephew, Charles E. Davis, and Miss. Ruth Jeanette Powell for preparing the map for reproduction.

SOME VARIETIES OF *PANICUM VIRGATUM*.

D. H. LINDER.

THERE has been considerable difficulty in separating from *Panicum virgatum* L. its var. *cubense* Griseb. or var. *obtusum* Wood. Wood's description¹ of the spikelet of the latter variety (from New Jersey) so closely matches the figure published by Hitchcock & Chase² of a spikelet from Grisebach's type of var. *cubense* that there is no doubt that the two varieties are identical. By Hitchcock & Chase the species and variety are separated in a general way by the size of the spikelets, the stoutness of the culms, and the shape of the panicle. Very little Cuban material has been examined, but such as has been studied closely matches the North Carolina and New Jersey plant referred to var. *cubense*. The appearance of the panicle is quite marked, the rays being fewer and farther apart than in typical *P. virgatum*, but the best criterion for the separation of the two is the spikelet. In the variety the lower glume is less than half the length of the spikelet and is broad and blunt, the second glume and the palea are about equal in length and are slightly exceeded by the lemma. The floral parts usually are appressed, giving the spikelet a cylindrical outline.

¹ Wood, *Botanist and Florist*, 392. 1874.

² Hitchcock & Chase, *North American Panicum*. *Contrib. U. S. Nat. Herb.* 15: 93. 1910.

The range of the variety in the New England states is very limited, the only material seen coming from Dennis on Cape Cod and from Westerly, Rhode Island, while the typical *P. virgatum* appears to be limited in New England to the Connecticut Valley from Vermont and southwestern New Hampshire to Connecticut. South and west of this region, typical *P. virgatum* is more general in its distribution.

Growing on the rocks, shore of Flatt's Inlet, Bermuda, is a stout, succulent plant which differs conspicuously from *P. virgatum*. The leaves are broad, smooth, stiff, and coriaceous, the sheaths slightly shorter than the internodes. The panicle is narrowly ellipsoid and dense, the spikelets on short (1-2 mm.) pedicels. The spikelets are easily separated from those of true *P. virgatum* by having the lower glume two-thirds the length of the spikelets and the midvein serrate



Fig. 1. Base of typical *P. virgatum*.

towards the summit. The lemma is rounded, almost truncate, and is exceeded by the second glume.

In the southern states, from Florida to Mississippi, there is another striking variation which differs from the typical *P. virgatum* by having the lower rays shorter than or barely equalling the numerous, very slender, many-flowered middle ones, the panicle thus having an ellipsoid-cylindrical outline which is distinctive. It can not possibly be confused with *P. virgatum* var. *confertum* Vasey,³ in which the panicle is much larger, the lower rays far exceeding the middle and upper, var. *confertum* thus being scarcely separable from typical *P. virgatum* to which Hitchcock & Chase rightly reduce it. *P. virgatum*,

³ Bull. Torr. Bot. Club. 13: 26. 1886.

var. *breviramosum* of Nash⁴ differs from the new *P. virgatum*, var. *thyrsiforme* by having a much smaller panicle (9–13 cm. long, 3–5 cm. wide) and shorter leaves.

Ranging from southeastern Nova Scotia and near the coast from the lower Penobscot Valley to New Jersey and locally to central New York, is a variety which has been confused with both *P. virgatum* and its var. *cubense*. It is, however, readily separated from these by having, not the long scaly, creeping rootstock, but very numerous culms rising from a stout multicipital caudex with very short internodes and with quickly ascending short basal offshoots. The shape of the spikelet in the cespitose plant differs from that of true *P. virgatum* in that, owing to the spreading of the first glume (a habit which, however, is not constant), the spikelet looks blunt and squarish instead of elongate. Again, the spikelet has a more constant length, ranging between 3.2 and 4 mm., the majority being around 3.5 mm.; while the spikelets of typical *P. virgatum* range from 3.5 to 6 mm. in length. The panicle varies from open to quite close, just as in the true form of the species.



Fig. 2. Base of var. *spissum*.

The following key will give a more concise idea of the classification of the varieties here discussed:

Plants with long, scaly, creeping rootstocks.

Lower rays of panicle longer than middle ones.

Spikelets 3.5–6 mm. long: palea shorter than second glume

P. virgatum L.

Spikelets 2.8–3.2 mm. long: palea and second glume subequal

var. *cubense* Griseb.

Lower rays of the panicle scarcely exceeding the middle ones.

Blades 12–15 mm. broad, stiff, coriaceous: lemma rounded at tip: second glume short-mucronate: panicle ellipsoid

var. *scorteum*.

Blades 7–11 mm. broad, not stiff or coriaceous: lemma pointed: second glume tapering to subulate tip: panicle ellipsoid-cylindrical

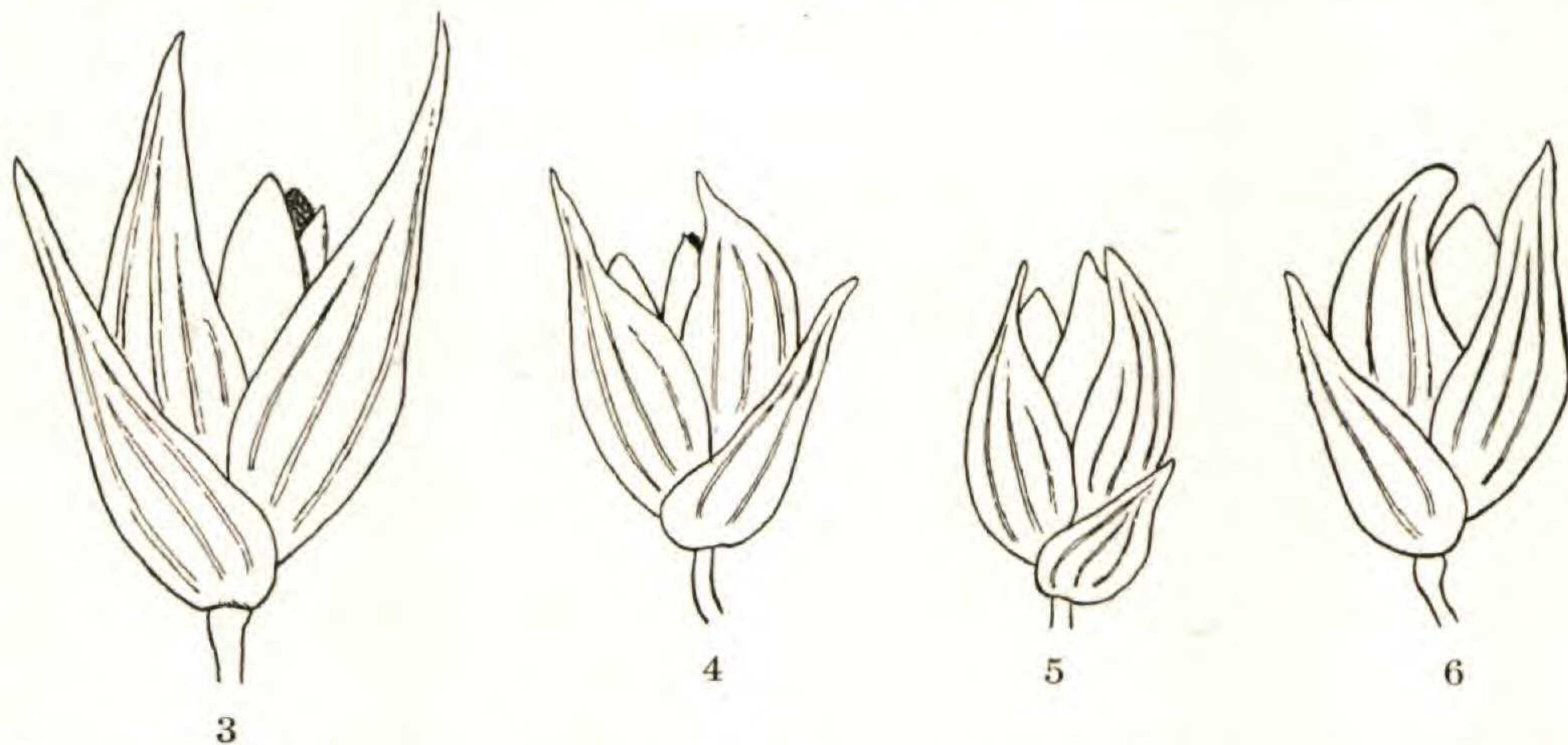
var. *thyrsiforme*.

Plants with short, quickly ascending rootstocks, forming tussocks

var. *spissum*.

⁴ Bull. Torr. Bot. Club. **23**: 150. 1896.

Panicum virgatum L., var. **scorteum**, n. var., perenne; culmis erectis robustis simplicibus paucis vel solitariis 7.7 dm. altis; rhizomatibus squamosis repentibus; laminis 4.1–4.5 dm. longis 1.1–1.2 cm.



Figs. 3–6. Spikelets $\times 5$. 3, type-form; 4, var. *spissum*; 5, var. *cubense*; 6, var. *scorteum*.

latis levibus rigidis coriaceis; paniculis anguste cylindratis multifloris, rami inferioribus medios paullo superantibus; spiculis 3.5 mm. longis; gluma superiore breviter mucronata; lemmatibus sterilibus apice rotundatis, gluma superiore brevioribus paleam superantibus.

Culms erect, stout, solitary or few, 7.7 dm. tall: rootstock scaly, creeping: blades 4.1–4.5 dm. long, 1.1–1.2 cm. broad, smooth, stiff, coriaceous: panicle narrowly ellipsoid, contracted, and many-flowered, the lower rays barely equalling the middle ones: spikelet 3.5 mm. long: first glume two-thirds the length of spikelet with middle nerve serrate towards the summit, shorter than the second glume and exceeding the palea. BERMUDA: rocks, shore of Flatt's Inlet, Smith's Parish, July 8, 1905, *A. H. Moore*, no. 2,850 (TYPE in Gray Herb.).

Panicum virgatum L., var. **thyriforme**, n. var., perenne; culmis erectis simplicibus paucis vel solitariis 6.8–13.5 dm. altis; rhizomatibus squamosis repentibus; laminis 3.5–5 dm. longis 6–10 mm. latis, vaginis glabris; paniculis ellipsoideo-cylindratis 2.5–3 dm. longis 4–10 cm. diametro, ramis tenuissimis multifloris inferioribus vix medios aequantibus.

Culms slender, erect, simple, solitary or few, 6.8–13.5 dm. tall: rootstocks scaly, creeping: blades 3.5–5 dm. long, 6–10 mm. broad; sheaths glabrous: panicle ellipsoid-cylindrical, 2.5–3 dm. long, 4–10 cm. in diameter; rays very slender and many-flowered, the lower rays barely equalling the middle ones. FLORIDA: swamp, Indian River region, Brevard County, November 28, 1902, *A. Fredholm*, no. 5,580 (TYPE in Gray Herb.); swamp, Hillsboro County, August 28, 1904, *A. Fredholm*, no. 6,365; Pine Key, Key West, *Blodgett*; Bay Head, August 30, 1898, *Coombs*, no. 646. MISSISSIPPI: Biloxi, September 7, 1898, *S. M. Tracy*, no. 4,465. This last specimen is exceptionally large.

PANICUM VIRGATUM L., var. **spissum**, n. var., perenne; culmis erectis simplicibus numerosis 3.2–11 dm. altis; rhizomatibus brevibus statim adscendentibus; laminis 3–4.5 dm. longis 3–7 mm. latis longe acuminatis, vaginis glabris; paniculis rare contractis, ramis adscendentibus inferiore medios superantibus; spiculis quadratis 3.2–4 mm. longis; gluma inferiore acuminata 3–4 nervia; gluma superiore lemmatibusque sterilibus subaequalibus 5–7 nerviis paleam superantibus.

Culms erect, cespitose, from short quickly ascending rootstocks: blades 3–4.5 dm. long, 3–7 mm. broad, long-acuminate; sheaths glabrous: panicle rarely contracted; rays ascending, the lower exceeding the middle and upper ones: spikelets squarish, 3.2–4 mm. long: first glume attenuate, 3–4 nerved, two-thirds the length of the spikelet: second glume and sterile lemma subequal, 5–7 nerved, and exceeding the palea. This variety, as may be seen from the following citations, has its greatest development in eastern Massachusetts and Nova Scotia. NOVA SCOTIA: peaty pockets in cobbly beach, Great Pubnico Lake, September 6, 1920, *Fernald, Long, & Linder*, no. 19,766 (TYPE in Gray Herb.); gravelly thicket bordering Salmon (Greenville) Lake, August 13, 1920, *Fernald, Long, & Linder*, no. 19,758; cobble beach of Butler's (Gavelton) Lake, Gavelton, September 4, 1920, *Fernald, Long, & Linder*, no. 19,760; boggy savannah bordering St. John's Lake, Springhaven, October 8, 1920, *Fernald, & Linder*, no. 19,767; sandy and gravelly beach of Bower's (Beaver Dam) Lake, September 10, 1921, *Fernald & Long*, no. 23,187; cobbly beach of Jones Lake, Roseway River, August 3, 1921, *Fernald & Long*, no. 23,184; upper border of cobbly beach, McKay's Lake, Middle Ohio, Shelbourne County, August, 3, 1921, *Fernald & Long*, no. 23,183; upper border of cobbly beach, Wentzell Lake, Lunenburg County, August 17, 1921 *Fernald & Long*, no. 23,185; rocky shore, Gilfilling Lake, August 23, *Fernald & Long*, no. 23,186; cobbly beach, Goven Lake, July 23, 1921, *Fernald, Long & Bartram*, no. 23,182. MAINE: railroad ballast, Bangor, September 7, 1916, *Fernald & Long*, no. 12,480; rocky shore, south end of island, Pushaw Bridge, Oldtown, September 18, 1899, *Fernald*; damp sandy shore, Kezar Lake, Lovell, August 30, 1918, *Pease*, no. 17,288; border of salt marsh, Wells, August 8, 1916, *Fernald & Long*, no. 12,478. NEW HAMPSHIRE: shore of Ossipee Lake, September 9, 1903, *T. O. Fuller*; salt marsh island, Seabrook, August 7, 1898, *E. F. Williams*. MASSACHUSETTS: brackish soil, Amesbury, July 23, *White*, no. 248; Medford, July 30, 1880, *C. E. Perkins*; in wet sand of dune hollows, Plum Island, August 11, 1913, *White*, no. 312; edge of cranberry bog near Shawshine River, Ballardvale, September 26, 1903, *Pease*, no. 2,953; Revere, August 13, 1880, *C. E. Perkins*; Readville, July 28, 1870, *Wm. Boott*; Charles River, Dedham, July 27, 1883, *Fuller*; edge of swamp, Concord, August 28, *H. D. Thoreau*; open woods, Scituate, September 6, 1897, *E. F. Williams*; dry sandy upper beach of small pond west of White

Pond, Chatham, September 9, 1913, *Fernald & Long*, no. 8,525; stony beach, Barnstable, September 17, 1916, *F. T. Hubbard*; Eastham, August 24, 1914, *F. S. Collins*, no. 3,125; Chilmark, August 30, 1895, *S. Harris*; Wanwinnit, Nantucket, September 8, 1894, *E. F. Williams*. RHODE ISLAND: Newport, August 24, 1901, *E. A. Mearns*, no. 600; dryish borders of salt marshes about Harbor Pond, Block Island, August 19, 1913, *Fernald & Long*, no. 8,524; Prudence Island, July 23, 1911, *Hope*; Tiverton, August 19, 1877, *J. C. Phillips*. CONNECTICUT: Sawpit, Guilford, July 17, 1904, *W. R. Dudley*; sandy soil above strand of brackish pool, Old Lyme, September 2, 1918, *C. A. Weatherby*, no. D 1,820. NEW YORK: meadow, Ithaca, August 29, 1916, *Metcalf*, no. 5,512; sandy shore of Sweezy Pond, Southampton, Long Island, July 26, 1920, *St. John*, no. 2,564; thicket by pond-shore, Fisher's Island, August 10-15, 1920, *St. John*, no. 2,568; in sand, pine woods, Staten Island, September 14, 1917, *Gershoy*, no. 762. NEW JERSEY: Ventnor, August 20, 1898, *Githens*; Beach Haven, October 19, 1907, *Long*; sandy roadside, Barnegat City, September 22, 1908, *Long*; sandy places, Five-Mile Beach, October 2, 1899, *MacElwee*, no. 1,383. PENNSYLVANIA: Delaware River south of Torresdale, October 1, 1898, *Krout*; swamp, pasture, Fulton Loop, July 8, 1904, *Carter*.

The New England material is to be found in the herbarium of the New England Botanical Club, or the Gray Herbarium; that from New Jersey and Pennsylvania in the herbarium of the Philadelphia Academy of Natural Sciences.

In closing, I wish to thank Prof. Fernald for his valued assistance and Mr. Bayard Long for his kindness in arranging the loan of the material from the Philadelphia Academy

HARVARD UNIVERSITY.

MUSCARI COMOSUM A NEW INTRODUCTION FOUND IN PHILADELPHIA.

BAYARD LONG.

As in many of our higher schools throughout the country which give a general course in Biology, a portion of the work at the Philadelphia High School for Girls consists in preparing a small series of botanical specimens. Dr. Ida A. Keller has charge of this work. Through her close association with the Philadelphia Academy she has from time to time brought to notice specimens often of considerable interest collected by her students. To Miss Dorothy Keeney is due our